Example #1:

It has been shown that 74% of college freshmen return for their sophomore year (called the retention rate). In a random sample of 405 college freshmen...

(a) What is the chance that more than 79% return next year?

(b) What is the chance that the % that return is within 5% of the mean?

1) $p = 0.74$ $n = 405$

(a) conditions:

- SRS - stated random sample
- np & nq ≥ 10 - (405)(0.74) & (405)(0.26) ≥ 10
- pop ≥ 10n - there are more than 4050 college freshmen

conditions met --> $N\left(0.74, \sqrt{\frac{(0.74)(0.26)}{405}}\right) = N(0.74, 0.0218)$

$P(\hat{p} > 0.79) = 0.0109$

(b) $P(0.69 < \hat{p} < 0.79) = 0.9782$

Example #2: Carbon monoxide emissions for a certain type of car are known to follow a normal model with a mean of 2.9 g/mi. and a standard deviation of 0.4 g/mi.

(a) What is the probability that a randomly selected car has a CO level above 3.5 g/mi?

(b) The lowest 15% of emissions are below what level?

(c) A company has 80 of these cars in its fleet. What is the probability that the average emissions of its fleet is between 3.0 and 3.1 g/mi?

(d) There is only a 5% chance that the fleets mean emissions level is greater than what value?

N(2.9, 0.4)

(a) $P(X > 3.5)$ = normalcdf(3.5, E99, 2.9, 0.4) = 0.0668

(b) $P(X < A) = 0.15$ A = invnorm(0.15, 2.9, 0.4) = 2.485 g/mi

(c) n = 80

Conditions:

- SRS - assumed representative of all cars
- n ≥ 30 or normal pop - n = 80 ≥ 30 OR stated normal population
- pop ≥ 10n - there are assumed to be more than 800 of these types of cars

conditions met --> $N\left(2.9, \frac{0.4}{\sqrt{80}}\right) = N(2.9, 0.0447)$

(c) continued...

$P(3.0 < \bar{X} < 3.1)$ = normalcdf(3.0, 3.1, 2.9, 0.0447) = 0.0127

(d) $P(\bar{X} > A) = 0.05$ A = invnorm(0.95, 2.9, 0.0447) = 2.974 g/mi

Book problem: p. 437 #50

50) skewed $\mu=32$ $\sigma=20$

(a) P(X > 40) = ???

**We can't do this because the population is not normal, so we can't use normalcdf

(b) n = 10

STATE	CHECK
- SRS	- assumed representative
- n ≥ 30 or normal pop.	- n < 30 and pop. is NOT normal!

**Therefore, we can't do this either!

(c) n = 50

** checks pass:

STATE	**CHECK**
- SRS	- assumed representative
- n ≥ 30 or normal pop	- n = 50 ≥ 30
- pop ≥ 10(*n*)	- total # customers ≥ 500

conditions met --> $N(32, 20/\sqrt{50}) = N(32, 2.828)$

$P(\bar{x} > 40)$ = normalcdf(40, E99, 32, 2.828) = 0.0023

p. 434 #23

p. 434 #23

n = 150

rejected if more than 0.05 unsat.

p = 0.08 unsat.

$P(\hat{p} < 0.05)$

= 0.0883

State

① SRS

② $np \geq 10$, $nq \geq 10$

③ pop ≥ 10n

Check

① stated random

② (150)(0.08) ≥ 10, (150)(0.92) ≥ 10

③ there are more than 1500 apples

Cond. met → N(0.08, 0.0222)

(43) scores → L_1

% → L_2

(a) $\mu_s = 2.859$

$\sigma_s = 1.324$

(b) n = 40

State

① SRS

② n ≥ 30

③ pop ≥ 10n

(c) $N\left(2.859, \frac{1.324}{\sqrt{40}}\right)$

Check

① stated random

② n = 40 ≥ 30

③ there are more than 400 AP stat students.

(45) n = 63

$P(\bar{x} \geq 3) = 0.199$

$N\left(2.859, \frac{1.324}{\sqrt{63}}\right)$

Ch.18 CW

Get prgm GAME

Ch.19 Act.
#1-6
Submit results on Quia